

Undergraduate Research Symposium May 19, 2017 Mary Gates Hall

Online Proceedings

POSTER SESSION 1

Balcony, Easel 99

11:00 AM to 1:00 PM

Prototype Favorability and Sexual Violence Perpetration in Young Males

Kaitlyn Picinich (Kaitlyn) Pahler, Junior, Psychology, Biology (General)

Mentor: Melissa Lewis, Psychiatry & Behavioral Sciences

Mentor: Dana Litt, Psychiatry & Behavioral Sciences

Mentor: Anne Fairlie

Previous research has found associations between alcohol consumption and male perpetration of sexual assault. About 50% of male adolescent and college age perpetrators report they were under the influence of alcohol at the time of the incident. Additionally, research suggests that young adults who perceive same-sex peers as engaging in alcohol-related sexual behavior report elevated rates of risky alcohol-related sexual behavior. However, little is known about whether alcohol-related perpetration is associated with having favorable views toward the prototypes (i.e. images of the type of person who engages in a risk behavior) of alcohol-related sexual behavior. This study investigates whether favorable prototypes will have a positive association with participant's identification as a perpetrator. We hypothesized that having more favorable prototypes, and feeling more similar to, typical males who engage in sexual behavior after drinking would be positively associated with perpetration. To test this, we utilized a data set comprised of a national sample of young males (n=463) ages 18-20 that completed a one-time online survey about health and risk behaviors. Participants were asked to report the number of times in the last 12 months they forced or attempted to force sexual contact on an individual who was too drunk or out of it to stop what was happening. Participants also reported on a 6 point scale how much the following words: "smart", "popular", "mature", "careless", "attractive", and "risky", describe their image of a typical male their age who has sex after 4/5 or more drinks. They rated how similar they are and how often they think about this typical male. Hierarchical regression analyses were conducted to determine the association of prototype favorability and alcohol-related sexual assault perpetration. Results from this study may provide insight about alcohol-related perpetration, which in turn could shape interventions.

SESSION 1H

HIV: DIAGNOSTICS, DRUG RESISTANCE, AND ANTIBODIES

Session Moderator: Dara Lehman, Global Health, Human Biology

MGH 251

12:30 PM to 2:15 PM

* Note: Titles in order of presentation.

Novel Strategies to Measure HIV-2 Resistance in Real-Time

Sara Masoum, Senior, Biology (Molecular, Cellular & Developmental)

Mary Gates Scholar

Mentor: Geoffrey Gottlieb, School of Medicine

Mentor: Dana Raugi, Medicine/Allergy & Infectious Diseases

Two human retroviruses cause AIDS: HIV-1 and HIV-2. HIV-2 is less pathogenic than HIV-1, with lower plasma viral loads, decreased transmission and mortality rates, and a slower decline in CD4+ T cells. Despite this, many patients progress to clinical AIDS and may benefit from antiretroviral therapy (ART). HIV-2-infected patients failing first-line ART often harbor drug-resistant strains of the virus that limit second-line treatment. Consequently, there is a need for rapid, inexpensive HIV-2 drug resistance testing that can guide second-line therapy. In this study, we optimized and validated a novel genotypic drug resistance test for HIV-2 using dried blood spots (DBS). Specimens for this project were collected as a part of an ongoing cohort study of ART for HIV-2 infection in Senegal, West Africa. Blood samples from HIV-2-infected patients were spotted onto filter paper and shipped via courier "overnight" to Seattle at ambient temperature. We then extracted viral RNA and DNA from the DBS, amplified genes of interest using nested PCR, and identified mutations at major drug resistance sites after population sequencing. After obtaining genotypes from only three of 42 (7%) of DBS from a previous protocol, we designed a new, optimized protocol and were able to genotype 10 of 22 (45%) DBS, including five of seven (71%) with HIV-2 plasma viral loads over 50 copies/mL. Drug resistance mutations V47A (protease) and M184V (reverse transcriptase; RT) were observed in 63% and 75% of genotypes, respectively –

75% had evidence of multi-class resistance to both protease and RT inhibitors. These results show that DBS genotyping can identify major drug resistance mutations in HIV-2 patient samples, thereby guiding second-line ART for HIV-2 infection. Because DBS-based resistance testing is a low-cost testing approach which provides results within a clinically-actionable timeframe, we expect that this innovation will improve HIV-2 patient care in resource-limited settings.

POSTER SESSION 3

Commons West, Easel 10

2:30 PM to 4:00 PM

Understanding Gender Differences in Alcohol Consequences and Alcohol-Related Sexual Consequences

Michelle Y Nhi (Michelle) Pham, Junior, Public Health-Global Health

Mentor: Anne Fairlie

Mentor: Melissa Lewis, Psychiatry & Behavioral Sciences

Mentor: Dana Litt, Psychiatry & Behavioral Sciences

Studies have shown that alcohol consequences are associated with alcohol-related sexual consequences. Studies on young adults have found that alcohol use is linked to risky sexual behavior, and alcohol-related sexual consequences are common. Women absorb and metabolize alcohol differently than men, and literature has found gender differences in alcohol consequences. However, gender differences in alcohol-related sexual consequences and the association between alcohol consequences and alcohol-related sexual consequences have been understudied. The current study will examine (1) gender differences on subscales of alcohol consequences and alcohol-related sexual consequences and (2) associations among alcohol consequences and alcohol-related sexual consequences by gender. We hypothesize that women will exhibit higher scores than men on the subscales of academic/occupational consequences, blackout drinking, impaired control, risk behaviors, and self-care. Additionally, we hypothesize that women will exhibit higher scores than men on the subscales of disregard of personal boundaries, neglect to use birth control, and sex with someone they just met. The current study used baseline data from an intervention study focusing on drinking and sexual behavior among a national sample of young adults (N = 402), who completed an online survey. Participants reported if they experienced alcohol consequences (21 items), such as “While drinking, I have said or done embarrassing things.” Additionally, participants reported if they experienced alcohol-related sexual consequences (41 items), such as “I had digital sex I later regretted.” Regression analyses for count outcomes were conducted to test gender differences in alcohol consequences and alcohol-related sexual consequences, controlling for alcohol use and sexual behavior. Spearman correlations were also conducted. Results will provide a better understanding of the

relation between alcohol and alcohol-related sexual consequences and help shape interventions for reducing behavioral risks.

POSTER SESSION 3

Commons West, Easel 9

2:30 PM to 4:00 PM

Do Attitudes Mediate the Relationship Between Alcohol-Related Consequences and Alcohol Consumption?

Samantha Blair (Sam) Kossof, Junior, Psychology

Mentor: Dana Litt, Psychiatry & Behavioral Sciences

Mentor: Melissa Lewis, Psychiatry & Behavioral Sciences

Previous research has recognized a link between drinking alcohol and later negative consequences such as physical, legal, academic, interpersonal, and sexual problems. Despite the well-known risks linked to heavy drinking, young adults continue to engage in risky drinking behavior especially when they have positive attitudes about heavy drinking. However, little is known about why the relationship between alcohol-related consequences and drinking exists. We propose that attitudes act as a mediator between consequences and drinking. We hypothesize that the more alcohol-related consequences a young adult has experienced, the more favorable their attitudes will be towards drinking, which will ultimately lead to more drinking. To test our hypothesis, a national sample of 1002 young adults aged 18-20 were asked to complete an online survey on young adult health, including drinking attitudes and alcohol consequences. Participants reported the number of drinks they consume on a typical week, the frequency of drinking they consider acceptable, and the number of drinks they consider acceptable to consume in one sitting. Additionally, participants reported whether or not they experienced any alcohol-related consequences in the past 3 months, including but not limited to: “blacking out”, vomiting, a hangover, or driving a car while drunk. In order to test mediation, bootstrap estimation multiple mediation analysis (SPSS Process macro) will be used. Results of this study will provide a better understanding about young adults’ cognitions regarding alcohol-related consequences and may help shape interventions by allowing individuals to draw from their past experiences to guide their future decision-making.

POSTER SESSION 3

Commons West, Easel 35

2:30 PM to 4:00 PM

Sexual Experience and its Association with Condom Use after Drinking

Elliot Wallace, Senior, Psychology, Spanish

Mentor: Melissa Lewis, Psychiatry & Behavioral Sciences

Mentor: Dana Litt, Psychiatry & Behavioral Sciences

Mentor: Anne Fairlie

Previous research has found that alcohol consumption among young adults is linked to an increased likelihood of engaging in risky sexual behaviors, including unprotected sex. When examining the likelihood of safe sex practices, additional research has found that having sex at a younger age (<14) is associated with a lower likelihood of using contraception. However, there is a gap in the literature around how number of sexual partners plays into this relationship. The current study aimed to investigate the association between age of first sex and number of lifetime sexual partners with condom use after alcohol consumption. We hypothesized age at first sexual experience would be positively correlated with condom use during penile-vaginal, anal, and oral sex while under the influence of alcohol in the past three months. Additionally, we hypothesized that the number of lifetime sexual partners would be negatively correlated with condom use in the past three months after alcohol consumption. To test these hypotheses, the present study (n = 1002) used data from a national sample of young adults, ages 18-20, who completed a one-time online survey. Participants were asked age at first penile-vaginal, anal, and oral sex as well as their number of lifetime sexual partners. Additionally, participants were asked number of times they had sex in the past three months after consuming alcohol and of those times, how often they used a condom. Regression analyses were conducted to determine the association between first age of sexual encounter and likelihood of using a condom, as well as number of lifetime partners and the likelihood of using a condom, both after consuming alcohol. Results from this study may help us understand how previous sexual experience is related to the likelihood of practicing safe sex after alcohol consumption.

cancer, and for the development of vaccines against diseases such as AIDS, tuberculosis and malaria. Previous research on conversion of memory precursor effector cells (MPECs) into memory T cells has found evidence of Treg cell involvement in the process. Treg cells are regulatory helper T cells which selectively inhibit effector T cells to prevent and suppress overly strong immune responses and autoimmune responses. Research has also shown that MPECs produce their own IL-2, a cytokine involved in immune tolerance and activation. Based on these data, we hypothesize that direct interaction between MPECs and Treg cells, possibly via MPEC-produced IL-2, is required for conversion of MPECs into memory T-cells. We also addressed colocalization of Treg cells with short-lived effector cells (SLECs). SLECs are IL-2 non-producing effector cell counterparts of MPECs and do not form memory. Potential MPEC or SLEC interaction with Treg cells was visualized through immunofluorescence microscopy of the secondary lymphoid organs (spleen and lymph nodes) of experimental mice injected with lymphocytic choriomeningitis virus (LCMV). To bypass the low precursor physiological frequencies of MPECs we employed the P14 LCMV GP33-specific TCR transgenic mouse system, which is a well-regarded model system for studying memory differentiation. To test the role of IL-2 in cell-cell interactions, we used IL-2 agonist and antagonist antibodies. A detailed understanding of how Treg cells are involved in the process of MPEC to memory T cell conversion is key to developing novel immunotherapeutic treatments.

POSTER SESSION 4

MGH 241, Easel 162

4:00 PM to 6:00 PM

Visualizing CD8 T-Cell and Regulatory T-Cell Interactions during Memory Differentiation

Adithya Krishna Sonal (Adithya) Vegaraju, Senior, Chemistry, Biochemistry

UW Honors Program

Mentor: Vandana Kalia, Pediatrics

Mentor: Surojit Sarkar, Pediatrics and Pathology

Mentor: Yevgeniy Yuzefpolskiy

Fundamental understanding of how effector T-cells are transformed into quiescent memory T-cells is vital for developing immunotherapeutic treatments for autoimmune diseases and